Questions and Answers

EPA Headquarters Low Impact Development Demonstration Project

Q: What is Low Impact Development?

A: Low Impact Development (LID) is development that results in low impacts on natural resources. This is done by using planning and designs that preserve green space and manage stormwater to minimize increases in flow and pollutants. LID techniques include conservation of forests and sensitive waters, water reuse, and stormwater controls that detain and retain rainfall throughout the development.

Q: Why is LID needed?

A: LID is needed to reduce the water quality impacts caused by land development and construction. Roofs, pavement, and other impervious surfaces displace vegetation and blanket the soil. As a result, less stormwater soaks into the ground and more runs off the land surface. Small tributaries and even larger streams cannot accommodate the increased water volume and flow. This can lead to eroded streambanks, incised channels, streams choked with sediment, destroyed aquatic life and aquatic habitat, and increased flooding and property damage. In addition, stormwater carries a broad mix of toxic chemicals, bacteria, sediments, fertilizers, oil and grease to nearby streams.

Traditional development and stormwater management approaches are not intended to address these water quality concerns. Instead, many storm drainage systems are designed to remove water from the site as quickly and efficiently as possible. Use of LID in stormwater management results in flow and pollutant reduction needed to reduce the impacts on our receiving streams.

Q: Doesn't stormwater go to a water treatment plant?

A: In most places, stormwater goes into storm drains, which lead directly to nearby waterbodies—rivers, streams, lakes, and oceans—without any reduction of runoff flows or pollutants.

Some large older cities—like Washington, DC—have *combined sewers*, which transport stormwater as well as sewage and wastewater from homes and businesses to a wastewater treatment plant. The wastewater treatment plant can usually handle the sewage/stormwater mix. During large storms, however, high water volumes overwhelm the treatment plant. When this happens, untreated sewage and polluted stormwater go directly into local waterways—such as the Potomac River in Washington, DC's case.

Retaining as much stormwater as possible on the land—rather than letting it run into storm drains—can help keep harmful flows and pollutants out of our streams and rivers. LID practices like those in our demonstration site are important tools in this effort.

Q: How does LID work?

A: LID is based on the premise that nature is the best manager of water and stormwater runoff. In forests and other natural areas, most rainfall percolates through the soil, is absorbed by vegetation, or evaporates to the atmosphere. LID is a means of enabling even developed areas to simulate nature to preserve predevelopment flow conditions.

When humans replace the natural landscape with roads, parking lots, roofs, and other impervious surfaces, rainfall can no longer soak into the ground. This results in a tremendous increase in polluted runoff.

Traditional stormwater management uses miles of costly pipes and acres of stormwater ponds to deal with this additional runoff. LID takes another approach.

Rather than collecting and sending stormwater runoff through storm drains, pipes, or other conveyances, LID uses natural vegetation and small-scale treatment systems to treat and infiltrate stormwater runoff close to where it originates. Reducing the amount of stormwater runoff generated in the first place reduces impacts on streams carrying stormwater.

Q: Does LID cost more than the traditional way of managing stormwater runoff?

A: No. LID practices can help a community better protect its streams, fish and wildlife habitat, wetlands, shellfish growing areas, and drinking water supplies as it grows.

But that’s not all.

LID also provides other economic and community benefits. LID helps communities—local governments, businesses, and residents—grow more attractively. A community using LID practices grows with more trees, open space, and plantings. A *greener* neighborhood can increase property values.

A recent EPA-sponsored review of 16 case studies throughout the United States and Canada[1] shows that LID practices can reduce development project costs *and* improve water quality protection. In some cases, initial material costs for LID practices were higher due to the cost of porous pavements, increased site preparation costs, or more expensive landscaping practices/plant species. However, in most cases, significant savings were realized during the development and construction phases of the projects because of reduced costs for site grading and preparation, stormwater infrastructure (e.g., pipes, stormwater ponds, and other structures), site paving, and landscaping. Compared with traditional development practices, LID methods created total capital costs savings between 11 and 40 percent.

Q: Why is EPA demonstrating LID techniques?

A: EPA promotes the use of LID techniques in several of its water pollution prevention programs. By implementing many of these techniques itself, the Agency is leading by example and demonstrating its support for—and confidence in—LID practices. EPA hopes that those who see these demonstrations will have a better understanding of their value in stormwater management.

While LID techniques reduce the amount of pollution entering the nation's waterways, they are still not widely used. EPA wants to demonstrate firsthand what LID practices can accomplish and, at the same time, show that the practices can be visually appealing. EPA hopes that demonstration projects such as this will encourage more government agencies and developers to use LID techniques.

Q: Who is involved with this project?

A: This demonstration project is truly a collaborative effort involving various partners. EPA's Office of Water provided conceptual designs for the LID practices being demonstrated. The Facilities Management Division of EPA's Office of Administration and Resources Management oversaw their construction. The General Services Administration (GSA) designed and maintains the landscape, including trees and plants. Others parties joined as this project evolved, including the U.S. Commission of Fine Arts, the National Capital Planning Commission, the DC Water and Sewer Authority, and a variety of contractors.

Q: Are other federal agencies using LID?

A: Definitely. Under Executive Order 13101 issued by President Clinton, federal agencies are instructed to take the lead in implementing water conservation and reuse techniques such as LID. In addition to EPA Headquarters, stormwater runoff projects

[1] *Economic Benefits of Low Impact Development Practices.* Draft—July 2006. Prepared by Tetra Tech, Inc., for U.S. Environmental Protection Agency, Office of Water, Nonpoint Source Branch, Washington, DC.

are being implemented at many other federal agency sites. There is a great set of LID demonstrations at the Navy Yard in Southeast Washington, and the Department of Defense (DoD) has developed an impressive LID design manual to be used for all DoD projects. Also, GSA is planning to renovate the historic 1932 John W. McCormack Post Office and Courthouse Federal Building in downtown Boston. EPA Region 1 will be the lead tenant in the building, occupying approximately 225,000 square feet of space in the 633,032-square foot building. A green roof designed to control the quantity and quality of stormwater runoff will be among the environmental amenities. Other agencies, such as the Department of Interior and National Oceanic and Atmospheric Administration, have added or will add green roofs to some of their facilities.

Many local agreements also call for LID and similar approaches to water quality protection. The regional Chesapeake Bay Agreement, for example, requires federal agencies to improve the quantity and quality of stormwater runoff within the Chesapeake Bay watershed. In part to comply with this agreement, the Architect of the Capitol and other agencies are using LID practices similar to those demonstrated at EPA Headquarters.

Q: What LID techniques are being demonstrated at EPA Headquarters?

A: The Ariel Rios South Courtyard features two bioretention cells (often called rain gardens), concrete permeable paving, and concrete permeable pavers, which allow stormwater to filter into the ground rather than wash off the surface and into storm drains and combined sewers. In addition, the South Courtyard has a cistern to recycle stormwater for irrigation. Sustainable planting is also included in the courtyard landscape. Plants take up stormwater and provide valuable wildlife habitat. Other sustainable best management practices include reuse of an historic granite curb as a bench, recycled farm tool plant signs, and recycled glass in the cistern cover and artwork.

Four additional rain gardens are along Constitution Avenue between 12th Street and 14th Street. Future LID practices at the EPA West Building include diverting stormwater runoff from the building roof into six 1000-gallon cisterns in the below-grade parking garage. The cistern water will be used to irrigate the West Building's Constitution Avenue planting beds and grass.

Q: Did you consider a green roof at EPA Headquarters?

A: Yes, we have considered demonstrating the green roof technology at EPA Headquarters but have not found a suitable location yet. Any future proposed location of a green roof installation will require approvals from the U.S. Commission of Fine Arts, the General Service Administration, and the National Capital Planning Commission.

Q: Does the South Courtyard cistern recycle roof runoff like the West Building garage cisterns?

A: No. It recycles stormwater washing off impervious portions of the courtyard and any water percolating through the rain gardens, pervious paving, and pervious pavers.

Q: Why did you choose the South Courtyard?

A: The South Courtyard was an available open space at EPA Headquarters that provided an opportunity for demonstrating various LID practices. We are proud that it has been transformed into an attractive place where EPA employees and their guests can relax and learn about some of the newest innovations in our stormwater management toolbox.

Q: Can visitors view the demonstration project?

A: Yes. Interpretive signs along the heavily-traveled Constitution Avenue sidewalk will inform passersby about the rain gardens there. In addition, visitors will have some access to the South Courtyard site and the West Building cisterns. Guided tours of these sites will be available. If you are interested in a tour of any portion of the demonstration project, please contact LIDHQ@epa.gov.

We hope that these opportunities to view firsthand the demonstration project will inspire our visitors and EPA personnel to help spread the word about the attractiveness and water quality protection functions of LID techniques.

Q: Where can I find out more about the EPA Headquarters Low Impact Development Demonstration Project?

A: For more information, visit the following Web sites:

- Greening EPA: www.epa.gov/greeningepa/stormwater/index.htm
- Stormwater Management at the EPA Headquarters Office Complex: www.epa.gov/owow/nps/lid/stormwater_hq/
- Low Impact Development: www.epa.gov/owow/nps/lid/